June 21, 1966

See Below

S. D. Michaelson

WMD-ED

Tailings Stabilization Memorandum No. 1.
Status of WMD-ED Tailings Stabilization Studies

WMD-ED investigations of tailings stabilization were initiated in August 1964 at the authorization of Mr. J. C. Kinnear, Jr. Previously, attempts had been made at UCD and NMD to stabilize tailings with vegetation but results had been disappointing largely because young plants were "sandblasted" and killed before becoming established. Mr. Kinnear had learned of a synthetic rubber latex that can be used as a temporary stabilizing agent while plant growth becomes established and proposed further investigation of this and similar techniques.

WMD-ED set up its studies cooperatively with UCD where tailings stabilization investigations were underway in connection with the Great Salt Lake Authority's tailings utilization test project. The Great Salt Lake Authority had arranged for Utah State University to operate a vegetation test plot as part of the overall tailings test. UCD and WMD-ED personnel agreed that the UCD project engineer would coordinate Kennecott's work with the Great Salt Lake Authority and Utah State University; and that UCD-AMRS and WMD-ED personnel would perform the work for Kennecott.

Initial plans were made with Utah State University for planting a Great Salt Lake Authority vegetation test plot in the spring of 1965 using various vegetation types, amendments and mulches. In connection with these plans a sample of UCD tailings was sent to Utah State University for greenhouse tests to determine necessary soil amendments. These tests indicated good seed germination in the tailings and a need only for nitrogen to provide proper plant nutrients.

It became apparent in early spring of 1965 that there would be no field test area available for spring planting. Additional tailings were sent to Utah State University, therefore, for small scale field tests. These tests were started in the late spring, using ten different combinations of treatments and amendments.

WMD-ED and USU personnel met on July 30, 1965, to review the field tests and other work by USU. At this meeting it was brought out by USU personnel that although seed germination and initial plant growth were good in

tailings, the plants showed signs of reduced vigor as they matured. Necrotic conditions developed which were believed to be a reaction from heavy metals. Another factor revealed by the field tests was the value of leaching the tailings prior to seeding them. A memorandum of these findings was distributed to all interested UCD personnel.

The poor plant growth in the tailings materials appeared to be a possible answer to the limited tendency for vegetation to reseed itself and become permanently established during former vegetation tests in tailings at NMD and UCD. Samples of tailings from both Divisions were collected and submitted to USU for further studies of the possibility.

Up to this time the research performed by Utah State University had been at no charge as a taxpayer service. Initially the work was done for the Great Salt Lake Authority, but as the Authority's test program was postponed the University work became more of a direct service to Kennecott. When the growth problem became apparent it also was obvious that better knowledge of copper tailings would be necessary to properly evaluate the potential of plant growth in them. This research was beyond the scope of work proposed by the Great Salt Lake Authority and it was decided to postpone additional research until after the Great Salt Lake Authority test. At that time more research at Utah State University might be sponsored by Kennecott if deemed worthwhile.

Plans for the Great Salt Lake Authority's vegetation test had to be changed during January - March 1966 when it was learned that water available at the proposed test site was not suitable for irrigation. An alternate site was selected on the UCD tailings dike where suitable water would be available. Several members of the Great Salt Lake Authority insisted, however, that the test would have to be on public property, and a second alternate site was selected. The delays incurred in selecting a final vegetation test site and placing the tailings have made inception of the vegetation tests unlikely before fall of 1966 or spring of 1967.

Another possibility for tailings stabilization research developed when the U. S. Bureau of Mines contacted Mr. H. R. Spedden in January 1966 concerning a Bureau project to study tailings stabilization and utilization. Mr. Spedden referred the Bureau to WMD-ED and subsequent briefing meetings were held by personnel from the Bureau, the Great Salt Lake Authority, UCD and WMD-ED. The Bureau of Mines showed some interest in cooperating with the Great Salt Lake Authority vegetation tests but were not sure how Federal funds could be made available for the test. There has been no progress on this possibility.

Bureau of Mines personnel were also told of the plant growth research performed by Utah State University, with the suggestion that additional research might be sponsored by the Bureau. This has resulted in a tentative research program at Utah State University sponsored by the Bureau of Mines. The program is scheduled to start in July 1966 and extend over at least a three year period. It is budgeted at rate of $30,000 per year.

Representatives of UCD, NMD, and WMD-ED were at Utah State University on June 6, 1966, to inspect the small scale field vegetation tests in tailings and to discuss future tailings plant growth research with University personnel. At this meeting one of the University men suggested that Kennecott, because of its interest in the plant growth research, participate in an informal committee to direct the research and assure harmonious efforts by the University, the Bureau of Mines, and Kennecott. Subsequently, this possibility was mentioned to Bureau of Mines personnel who also were favorable to it, and organization of the committee is underway. Kennecott's participation on the committee will place us in direct contact with some of the more significant research into plant growth in tailings that is now underway in the United States.

CFE:jc

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